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September 2, 1958

Representative Lloyd Barnard  
Chairman, Prison Subcommittee  
The Montana Legislative Council  
Rooms 215-216, State Capitol  
Helena, Montana

Dear Representative Barnard:

I am transmitting herewith twenty copies of our report "A Development and Operational Plan for the Montana State Prison Ranch". This study was made by a committee of faculty members of the Montana Agricultural Experiment Station and the Montana Extension Service of the Division of Agriculture at Montana State College. Names of the committee members are listed on the attached sheet.

We have been pleased to work with the Prison Subcommittee of the Montana Legislative Council on the problems of the prison ranch. We hope our report may make a definite contribution to improved operation of the Montana State Prison.

Sincerely yours,

  
Roy E. Huffman  
Dean of Agriculture

REH:mh

cc: Eugene C. Tidball

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A DEVELOPMENT AND OPERATIONAL PLAN  
FOR THE  
MONTANA STATE PRISON RANCH

September, 1958



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# A DEVELOPMENT AND OPERATIONAL PLAN

FOR THE

## MONTANA STATE PRISON RANCH

### I. INTRODUCTION

Early in 1958 the Montana Legislative Council contacted the President of Montana State College relative to the development and reorganization of the operations of the Montana State Prison Ranch. Could the ranch be developed to provide most of the food for the prison and some for the other State institutions as it was contended when the ranch was originally purchased? What are the opportunities for prisoner rehabilitation?

In April, 1958, the Dean of Agriculture appointed a committee of 24 specialists from the Montana Extension Service and Montana Experiment Station to study the prison ranch operations. The Committee is submitting this report as a basic plan or framework from which competent ranch management can build a sound and useful ranch operation.

Several committee members recommended cooperation between the prison and other custodial institutions. It appears that operations can be more efficient by some cooperation, and although the Prison Ranch may not be capable of producing all the food needed by all State institutions, it can with proper cooperation furnish a substantial quantity for the prison and other institutions in the Deer Lodge Valley.

The committee sincerely hopes that this report will be used by the prison administration and that there will be continuing contact and consultation between them and subject matter personnel.

### II GENERAL ORGANIZATION

Organization of the Prison Ranch has been calculated on two bases. The first entitled "Present Ranch Capacity" is an organization plan based on full utilization of the ranch under present conditions. Numbers of livestock are limited by the immediate range and feed available. For the second basis referred to as "Fully Developed Capacity" it is assumed that crop rotation programs will be established and that where necessary land will be leveled, drained, the irrigation systems improved, an adequate fertilization program undertaken, and proper cultural practices put into effect so that productivity can be substantially improved. As the pasture production is increased (principally by the establishment of irrigated pasture) and feed production is increased (principally by crop rotation, fertilization, land leveling and the like) the numbers of livestock can be increased in all categories. It may take several years for the ranch to become fully developed and the increase in livestock should not be faster than the increase in feed production. It is, however, considered entirely feasible to increase yields and carrying capacities to the points described.



## A. Livestock Enterprises

### 1. Beef Cattle

The present carrying capacity of the Prison Ranch is a 600 cow herd. This herd, by running the steers until they are two to three years old, will supply the prison with its total beef requirement (336 carcasses annually) plus about 239 carcasses for other institutions. By developing irrigated pasture from presently irrigated crops and hay land the carrying capacity can be approximately doubled. When this is realized it will furnish 336 carcasses for the prison plus 694 for other institutions. The following table is recommended numbers of beef animals by classes:

	Present Ranch Capacity	Fully Developed Ranch Capacity
Breeding Females		
Cows	600	1200
Heifers - 2 years	145	290
Calves, weaner	480	960
Bulls	30	60
Yearlings		
Hereford	480	960
Holstein	100	100
Two Year Olds		
Steers, Hereford	240	480
Steers, Holstein	100	100

### 2. Dairy Cattle

It is recommended that there be only one dairy production center among the institutions in the Deer Lodge Valley. The most logical location is at Warm Springs. Recommendations are that this be a 200 milking cow dairy. It will furnish all required dairy products for the prison and the hospitals at Galen and Warm Springs.

A substantial portion of the dairy feed may be supplied by the Prison Ranch. It is recommended that the dairy farm at the prison be sold or otherwise disposed of as it has very little value to the Prison Ranch.

### 3. Swine.

The recommended swine enterprise is at present limited by the amount of feed that can be grown on the prison ranch. Eighty sows and 5 boars are suggested to produce 685 carcasses annually, an adequate supply for the prison. By developing the irrigated cropland by crop rotation and fertilization sufficient feed can be produced to increase fresh pork production to 850 carcasses.



#### 4. Poultry

- a. Chickens - Egg and broiler production recommendations are limited by the feed supply presently available from the prison ranch; it is, however, adequate for prison use, namely 1200 layers and 1200 broilers. Here again additional feed can be grown through proper cultural methods and the flocks increased to supply all the institutions in the Deer Lodge Valley. A flock of 6000 layers can be maintained which will supply all of the eggs required and 6000 broilers will furnish a substantial part of the fryer requirements.
- b. Turkeys - No change is recommended from the present 1000 head turkey enterprise. A portion of these are customarily used by the hospitals at Warm Springs and Galen in addition to prison use.

#### B. Horticultural Crops

Potatoes and vegetables and small fruits can be grown on the prison farm in sufficient quantities to furnish a large part of these food crops required by the three institutions. The principle addition to present facilities being added storage facilities. Recommendations are for 25 acres of potatoes and 40 acres of vegetable crops annually.

#### C. Feed Requirements for Livestock

The amount of feed required by the recommended numbers of livestock is summarized in the following tables:

##### 1. SUMMARY OF LIVESTOCK FEED REQUIREMENTS Present Ranch Capacity

Size	GRAIN			HAY		SILAGE	RANGE
	Wheat (BU)	Oats (BU)	Barley (BU)	Grass (Tons)	Alfalfa (Tons)	Alfalfa (Tons)	Grass (AUM's)
Beef Cattle	600 Cow			1915	142		9686
Feeder Cattle	270 hd	675	1440	86			
Horses	20 hd			81			90
Dairy Cattle	200 Cow	11666	16000		876	700	
Swine	685 Pig		18660		185		
Poultry	1200 Hens						
	1200 Broilers						
	1000 turkeys	902		2555			
Sub Total		902	12341	38655	2082	1203	700
Produced at Warm Springs						-876	-700
TOTAL		902	12341	38655	2082	327	0
							9776



2. SUMMARY OF LIVESTOCK FEED REQUIREMENTS  
Fully Developed Ranch Capacity

Size	GRAIN			HAY		RANGE	
	Oats (BU)	Barley (BU)	Wheat (BU)	Native (Tons)	Alfalfa (Tons)	Past. Irr. Past. (AUM's)(AUM's)	
Beef Cattle	1200	cow		2272	1724	10060	10080
Feeder Cattle	540	hd	1350	2900	172		
Horses		40	hd		160		180
Dairy	200	cow	11666	16000		876	
Swine	850	pig		23000		423	
Poultry							
Layers	6000		7523	3600			
Broilers	6000		346	167			
Turkeys	1000		666	333			
<b>TOTALS</b>	<b>13016</b>		<b>50435</b>	<b>3500</b>	<b>2604</b>	<b>3023</b>	<b>10240</b>
							10080

D. CROP PRODUCTION AND LAND USE

1. Present Ranch Capacity

Crop	AREA			Expected Yield	Total Production
	Irrigated Acres	Dry Acres			
Alfalfa	150	.		2.5 T	375 T
Oats	206		60	Bu.	12360 Bu.
Barley	314		50	Bu.	15700 Bu.)
Barley		1150	20	Bu.	23000 Bu.)
Wheat		61	15	Bu.	915 Bu.
Summerfallow		1211			
Potatoes	25		250	cwt.	6250 cwt.
Vegetables	25		160	cwt.	4000 cwt.
Grass Hay	2844		.75 T		2133 T

2. Fully Developed Ranch Capacity

Crop	AREA			Expected Yield	Total Production
	Irrigated Acres	Dry Acres			
Oats	242		60		12640
Alfalfa	1126		5 T		3097
Native Hay					2604
Barley	1170		50		37550
Barley		653	20		13060
Wheat		240	15		3600
Summerfallow		893			
Potatoes	25		250 cwt.		6250 cwt.
Vegetables	40		160 cwt		6400 cwt.
Irrigated Pasture	1166		6 to 10 AUM		10080
Reseeded cropland		2257	.25 AUM		564 AUM



## E. Facility and Equipment Requirements

For the most part, buildings and equipment are mentioned in that part of this report to which they relate. However, there are a few items which do not relate to one specific part of the report but which should be mentioned. They are as follows:

1. A food processing plant seems to be needed. This may be a frozen food storage plant, a food canning plant or a combination of both. It should include equipment for processing food as mentioned in other parts of this report such as poultry and horticulture. Better use can be made of seasonal food products with a proper processing and storage plant. The slaughterhouse is a logical beginning and a substantial part of food processing equipment. A new food processing plant is recommended in the vicinity of the slaughterhouse.
2. A feed processing plant is also recommended. This plant would grind, mix and prepare feed for all types of livestock and poultry. It might conceivably be composed of 4 steel tanks with hopper bottoms served by a common elevator leg and equipped with a mixer-grinder. Three of the tanks would store small quantities of grain or other feed ingredients with the fourth tank for the mixed feed. The grain could be hauled from existing storage to the plant and processed as needed. Each tank should be 7 to 10 ton capacity so that feed would not need to be hauled every day, but perhaps weekly.
3. A well equipped farm shop is most urgently needed. This shop should include a metal working area with such equipment as arc and acetylene welders, a lathe, a forge, power hacksaw, drill press and related tools. It should have a machinery repair area where tractors and implements could be run inside for repairs, cleaning and service. The customary mechanic's tools, testing and cleaning equipment are necessary here.

Another section could be woodworking with the customary tools. One area should be equipped for painting machinery and equipment. Such a shop would be invaluable from the standpoint of reducing over-all machinery cost and it would also provide good rehabilitation possibilities.

A valuable supplement to the shop would be a repair truck. This truck could be equipped with tools, spare parts and repair materials sufficient to make repairs in the field. The tools and materials can be changed from season to season according to the needs of the work in progress.

4. Machinery and farm implements in general should be kept up to date and in sufficient quantity to accomplish the farming operations in a timely and efficient manner. For example, the present inventory indicates a shortage of serviceable mowers for the present hay acreage. However, the trend is to use windrowers instead of mowers. Thus it is recommended that additional needed mower capacity be supplied with



self-propelled windrowers instead of mowers. This saves the raking operation, shortens the haying time and produces a better quality hay. However, when this step is taken it is logical to expect that fewer tractors will be needed. Thus tractors should be traded in or otherwise profitably disposed of, in order to reduce the total inventory in machinery. Other similar instances could be cited to bring out the fact that it is important to keep up to date machinery, to keep it in good repair and in the right quantity.

### III. SPECIFIC RECOMMENDATIONS

#### A. Management Personnel

For the prison ranch to be properly managed and profitable to the State of Montana, it is necessary that several full time supervisory personnel be employed. These employees should have an adequate salary to insure a long period of tenure plus incentive provision, if legally possible. They should be well qualified by both training and experience and prohibited from ownership of any livestock or similar ranch produce on the prison ranch. Supervisory personnel will report and be responsible to the Warden and/or Business Manager, preferably only one as administratively decided. Only on request of the various supervisors will any others, including legislators and state officials, consult, instruct and advise them, excepting only on order of the Warden and/or Business Manager. These supervisory personnel are expected to call in, at any time they deem it necessary, the aid of Specialists from the Montana Agricultural Extension Service or the Montana Agricultural Experiment Station.

It is understood that it would be impossible for the State of Montana to employ supervisory personnel for each phase of the ranch operation such as Range Management, Beef, Swine, Poultry, Crops, Irrigation, Horticulture and Weed Control. Most of these can be combined or grouped so one employee can efficiently supervise two or more of the ranch operations.

Following is a listing of necessary personnel and a summary of the phases of ranch management and duties they could efficiently supervise if well qualified in training and experience.

1. A full time Ranch Manager with residence on the ranch preferred. He should have training and experience in ranch management and personnel management.

He would:

Be in complete charge of the ranch operation with the aid and cooperation of the livestock, horticulture, farm and mechanics foreman.

Be responsible for all records of expenditure and production connected with the ranch operation and report these to the Warden and/or Business Manager.



Be responsible for planning the general organization of the ranch and implementation of a long range development plan.

See that training programs are carried out for the prison labor in all specialized work where labor with skilled training is necessary.

2. Livestock Foreman with ranch residence preferred. He should be a capable man with training and experience in livestock production.

He would:

Be responsible to the Ranch Manager.

Be in charge of all livestock production, beef cattle, swine, and poultry and keep all records of production and report them to the Ranch Manager.

Supervise the processing and distribution of beef, pork, and poultry and all other products arising from such production. He will distribute products so far as production provides to the prison and the hospitals at Warm Springs and Galen.

Consult with the Extension Range Management Specialist as to proper use of the range, water development and salting practices to increase efficiency and profitable production.

Conduct any training programs for prison labor necessary to carry out any phase of the livestock production in a more efficient manner.

Cooperate with the Horticulturist on storage of certain surplus meat products when an adequate food processing plant is provided for the prison.

3. Horticultural Crop Foreman. He should be trained and experienced in producing, processing and storing horticultural crops.

He would:

Be responsible to the Ranch Manager.

Plan, outline and direct the production, storing and handling of horticulture crops.

Report all production figures and cost of horticulture production to the Ranch Manager.

Conduct any necessary training programs for prison labor where it would increase and provide more efficiency of production.



Assure an adequate and a year-round variety of horticulture products for the prison kitchens.

Be responsible for all food storage.

4. Farm Foreman with residence on the ranch preferred. He should have training in agronomic practices.

He would:

Be responsible to the Ranch Manager.

Plan, outline and direct the production, storing and handling of all hay and grain crops and irrigated pasture.

Report all production figures and cost of production information to the Ranch Manager.

Conduct any necessary training programs for prison labor in connection with the farming operations.

Be in charge of all irrigation water and practices.

Have proper soil analyses made and carry out proper fertilization, crop rotation and other agronomic practices.

See that all agronomic practices are carried out at proper time and with approved methods.

5. Farm Mechanics Foreman with training in the operation, repair and maintenance of farm machinery.

He would:

Be responsible to the Ranch Supervisor.

See that all farm machinery is kept in good repair.

See that all implements and power units and farm trucks are adjusted for most efficient operation.

Conduct training programs for prison labor in connection with farm machinery operation, repair, and maintenance.

Serve as welding instructor and possibly machinery repair instructor for inmates other than farm labor inmates as time and equipment is available.



6. Dairy Manager, employed at Warm Springs, to supervise all phases of Milk production and distribution of milk and milk products to the hospitals at Warm Springs and Galen and the Prison.

B. Agronomic Recommendations.

1. Cropping Plans

Crop rotation schedules are set up for all irrigated land except native hay and pasture in order to permit maximum production of feed crops as required by the livestock enterprises suggested under fully developed conditions.

- a. The east block of irrigated land on Ranch No. 1 consisting of 587 acres included in fields numbered I-34 through I-47 consecutively, except for I-38 could be set up on a six year rotation. A recommended rotation is grain, alfalfa 4 years, then grain, potatoes and vegetables the sixth year. Such a rotation properly fertilized and managed can be expected to produce yields per acre of approximately 5 tons alfalfa, 50 bushels of barley and 250 sacks of potatoes.
- b. The block of irrigated land at the headquarters of Ranch No. 1 consisting of 409 acres included in fields number I-27 through I-33 consecutively could be set up on a six year pasture rotation leaving each field in pasture 4 years then 2 years in grain. These fields properly fertilized and managed could be expected to produce yields per acre of 50 bushels of barley and 10 animal unit months of pasture.
- c. The remaining irrigated land around Ranch No. 1, mainly that west of the buildings plus some fields to the south consisting of 820 acres in fields numbered I-4 through I-8 plus I-10 plus I-13 and 14 plus I-17 through I-26 plus I-48 through I-50 could be set up on a six year rotation with each field in pasture 3 years and grain 3 years. Expected yields from this area with proper fertilization and management are 50 bushels of barley and 8 animal unit months of pasture.
- d. The irrigated land at Ranch No. 2 consisting of 524 acres in fields numbered I-60 through I-65 could be set up on a seven year rotation with alfalfa in 4 years and grain three years. Corn silage might be substituted for the first year of grain after alfalfa if desired. Expected yields from this area properly fertilized and managed is 5 tons alfalfa, 50 bushels barley and 60 bushels oats.
- e. The Hagen ranch consisting of 281 acres in fields I-1, I-2 and I-3 could be maintained in irrigated pasture. A yield of only 6 animal unit months per acre is anticipated from this land. A higher yield might be expected if a rotation and fertilization were carried out. However, due to the distance to move machinery and prison labor it is anticipated that it will remain in pasture most of the time.



- f. The Hog Farm consisting of 100 acres in fields I-77 through I-81 could be set up on a six year rotation with 4 years in alfalfa and 2 years in grain for each field. Yields per acre with proper fertilization and management may be expected to be 5 tons alfalfa and 50 bushels of barley.
- g. The poorer dryland farming fields should be reseeded to grass. Fields D-2 through D-7 plus D-14, 15 and 16 plus D-20 and 21 plus D-27 and 28, and D-31 through 34 should be reseeded. These fields together with fields D-5, D-13 and D-30 which have already been reseeded comprise a total area of 2257 acres. It is expected that these reseeded areas will yield about as much grass as the average of the other ranges or approximately 1 animal unit month for 4 acres.

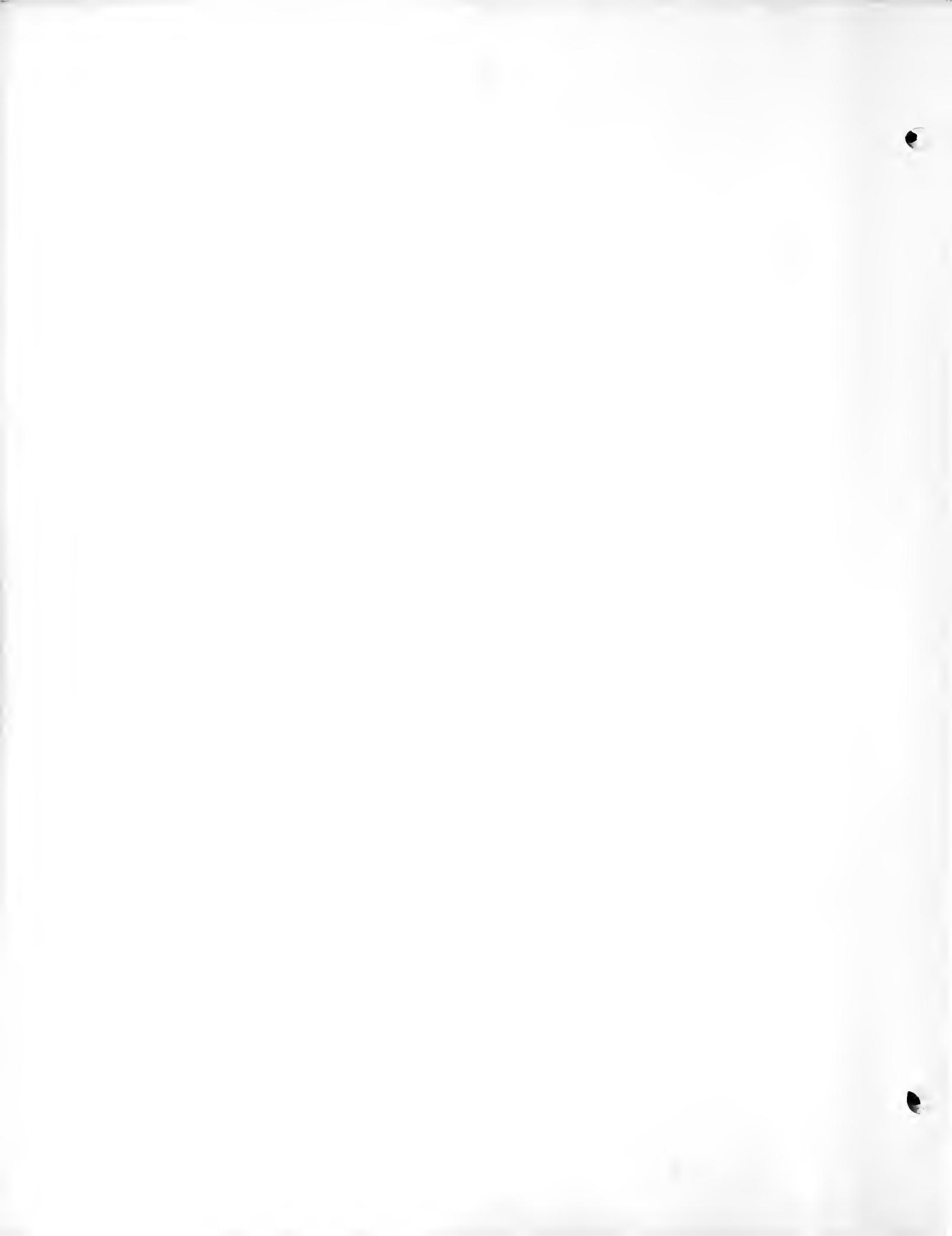
## 2. Crops

A survey of the crops and cropping system indicates that there may be need to develop a cropping system that will enable the abandonment of some land for cereal crop production and the establishment of a system that will permit a good job to be done on the better land that remains in annual crop. It may be desirable to bring additional land under irrigation or under a system of once a year irrigation for additional forage production.

It seems advisable, first of all, that the farm abandon the production of wheat, unless needed for poultry rations. As all grain production is fed, there is no reason to be producing wheat in any quantity on any of the dryland now in production. Even those areas that remain in dryland crops will produce a more satisfactory yield of barley than they will of wheat. Likewise, the production of oats in dryland would seem undesirable and this crop, if grown, should be confined to the irrigated lands.

To do an adequate job of crop production, machinery of a type and construction should be purchased and maintained to do a better and more timely job of planting, cultivating, harvesting and storing. It is recognized that there are problems connected with machinery use and maintenance, but in no other way will it be possible to produce crops in volume sufficient to make the farm self-sufficient on feed. Timeliness of operations can be very critical, particularly on dryland.

The acreage of irrigated land should be restricted in area to insure enough water to take the crops through the growing season. Full production on fewer acres, receiving at least one four-inch irrigation per season, will result in high total production. Fields that have too great a slope or are too uneven to make efficient use of the available water should be diverted to irrigated pasture production to favor efficient use of water and erosion control.



Any crops program designed for better land use and greater feed production will be, of necessity, a long-time program, designed to make some changes and progress each year without materially affecting the over-all feed production.

It is advised that only varieties, small grains, legumes and grasses recommended for the area be grown. Only high quality seed, free of weed seeds and crop mixture being used.

For small grains only Certified or Approved seed of the recommended varieties should be obtained. For the legumes and grasses only the Certified class of seed should be used. These classes of seed will insure varietal purity, freedom from perennial noxious weeds and high germination.

The local county agent may advise as to locally available seed supplies or seed firms where supplies may be obtained.

a. Dryland

At least 50% of the dryland now under cultivation is best suited to forage production. The soil is light, subject to erosion, and rocky. The rainfall pattern (8 to 10 inches) makes dryland cereal crop production hazardous under the most efficient system of management.

Any program should start with the elimination of the least desirable areas. These areas should be blocked out, even though some potentially good land is included, and seeded down to drought resistant grasses that would produce feed for early spring pasture and, in case of early fall moisture, for late fall pasture. Such rugged grasses as crested wheatgrass and big bluegrass offer excellent possibilities.

On the better areas, that could be left in dryland cereal production, a system of strip-cropping should be installed with the strips running at right angles to the prevailing winds, or at right angles to slopes subject to water erosion. If this fails to prevent erosion, then permanent strips of grass should be established and the alternate strips should be farmed on a crop-fallow basis. Block farming should be completely eliminated.

Rocks should be picked each year to permit the use of more satisfactory shovel type cultivation implements.

Timeliness of operation with efficient machinery for fallow and planting operations will do much toward obtaining the highest potential yield.



b. Irrigation

The production pattern of crops produced under irrigation is much better than under dryland. The legume and grass stands are in most cases adequate for the water available and replacement stands have been made at satisfactory intervals. Alfalfa alone should be the main hay crop.

Low cost water and irrigation costs must be kept in mind in any decisions made to include land areas under irrigation. A combination of long water hauls, involving expensive ditch construction, on land that carries too much slope, is too shallow in depth, or too heavy to take water readily, should not be considered for irrigation purposes until all suitable land has been brought up to maximum potential in production.

A short-term (5 - 6 year) rotation program should be developed and maintained to assure maximum forage production at all times. Where necessary, land should be leveled and irrigation systems revamped to provide an efficient water-use program. A suggested short-term rotation is small grain (legume or grass), potatoes, (or corn for silage,) and back to small grain (legume or grass). Grass would be used only on those areas where erosion was a problem or for pasture.

The grass or legume stands should be maintained. This will mean that they be replaced every three to five years. To have such a program plans should be developed so replacements each year will provide for new stands that will provide good yields of good quality forage. Timely cutting and storage of hay and other forages can aid immeasurably in attaining a maximum harvest of nutrients. The east block of some 600 acres of irrigated land properly rotated with small grain, legume and grass and potatoes or corn would permit the establishment of a new legume or grass unit each year.

The least desirable units of irrigated land - those that are rocky and hard to irrigate - could be utilized for irrigated pastures as a cow and calf unit prior to turning out on the range. This could supplement the usage made of the available grass on the dryland units.

The irrigated pasture units could well be kept in good growth for use when grass fed cattle are to be produced for slaughter. The maintainance of this pasture could be justified on the basis of such dual usage.

A combination of grasses and legumes that would provide for maximum growth and good production even at varying levels of moisture availability would help produce the desired results.



A long-time crops program for the farm should include the many factors stated herein. A definite method of procedure cannot be set down as a year to year calendar will have to be worked out when the time comes. Changes will have to be designed to cause the least possible effect on the current forage supply and will have to be adjusted to needs. If such a program could be started and show permanent results on an over-all farm program in ten to fifteen years, it would still mean a lot to the value of the farm and to the state of Montana.

### 3. Soils

The detailed soil survey work of the Soil Conservation Service with classification in detail and recorded on aerial map should be used as a standard reference.

#### a. Dryland Cultivated Area

##### (1) General Statement

###### (a) Depth

The soils are generally deep - over 60 inches in depth. Occasionally there are shallow spots with rocky or gravelly outcroppings in a few instances.

###### (b) Texture

The soils range from a medium type to moderately heavy on the surface. This same texture will carry on down into the subsoil strata. The finely ground granitic material gives the feel of a coarse textured soil. Enough silt and clay is present to render the soil a potentially productive one. The soils have not matured because of a lack of rainfall and vegetative growth.

###### (c) Moisture relationship

The soils have a moderately good water holding capacity. Drainage is moderate to moderately slow. The dryland lies in an 9 to 10 inch rainfall belt. This is insufficient to consider the land suitable for dryland farming in the long run.

###### (d) Slope

The general slope is to the east. Slope will range from 2 to 6 percent and to a greater degree on the hillsides. Undulating or rolling conditions exist although not extensive.

( )

( )

(e) Stoniness

Stones are quite prevalent in some areas. An occasional boulder lies in the fields. This is particularly rough on machinery as little attention is taken by the laborers in avoiding them. The buried rocks are hard on sub-tilling equipment.

(f) Erosion

The soil is very subject to wind erosion since it has been cultivated. Fields farmed in block have no protection during fallow season as stubble is light and worked into the soil. Strip cropping practiced on some fields is parallel to prevailing winds. The land was brought under cultivation within the last 10 to 12 years. Even though the erosion is not serious to date it will become increasingly hazardous under continuous cultivation.

(g) Classification

The bulk of the dryland cultivated area is Class III. The erosion hazard and low rainfall being the major limiting factors.

(2) Recommendations

(a) Cropping and land retirement

Approximately 50 percent of the current cultivated dryland should be taken out of production and seeded to permanent grass. Crested wheatgrass, Intermediate wheatgrass, Gib bluegrass and Russian wildrye are suggestions.

Those fields having a lower productivity record, excessive stoniness, those heavily infested with weeds and the small irregular shaped ones may be retired and seeded to grass. These reseeded fields would compliment the range area in the vicinity. Fencing would be required.

The two fields (estimated 500 acres) mapped as potential cultivated land should not be cropped. Consideration may be given to reseeding to native or introduced grasses if deemed advisable.

If in the future more water is available for irrigation, and the productive potential of irrigable lands is increased, then the feed production (barley) should be shifted to those lands. This would permit further retirement of the more marginal dryland fields to grass.



(b) Tillage

The larger fields should be strip farmed in a north to south direction. Maximum width of strips not to exceed 10 rods.

Subsurface tillage implements are advised for summerfallow operations. Maximum weed control and moisture storage can only be accomplished by well timed tillage operations. A reduction in the cultivated acreage would enable more timely tillage operations and be in line with equipment available.

b. Irrigated Land

(1) General Statement

Currently it appears that the lands under irrigation are utilized within their potential. The low lying, permanently wet or poorly drained areas are in native grass. These are used for hay production, pasture or limited late fall grazing.

Those areas with good drainage are generally used for alfalfa-grass production. Sixty to seventy acres of potatoes are also produced in fields east of the headquarters.

(a) Depth

The irrigated soils are highly variable in depth. In general the soils will average between 20 to 48 inches in depth. Gravelly outcroppings are frequent on the lower fields.

(b) Texture

The soils range from a medium to a moderately heavy type. These soils appear to have a higher moisture holding capacity than the dryland soils.

(c) Moisture relationship

A lack of a season-long water supply appears to restrict maximum productivity. The texture of the surface and sub-soil is such that penetration is about ideal. Exceptions are the gravelly outcroppings. Soils are well drained with little evidence of water-logging or alkali accumulations arising.

(d) Slope

A high degree of variability in slope exists. Uniform water applications are difficult to obtain on many fields. Steepness



of slope with row crops especially is presenting somewhat of an erosion hazard.

(e) Fertility

A phosphate deficiency for alfalfa is known to exist on lands east of the headquarters. The situation is not definite on the bench lands producing alfalfa.

(2) Recommendations

(a) Crop Rotation

A short term rotation program is deemed advisable. Alfalfa, Potatoes, possibly corn and close drilled grain crops being the only alternatives.

(b) Fertilization

On fields east of the headquarters a 120 pound application of available phosphoric acid is advised. The phosphate should be applied during seedbed preparation and ahead of seeding down to alfalfa. The phosphate may be applied with a broadcast spreader and plowed down.

Strip applications on a trial basis are advised on alfalfa lands lying to the west of headquarters. The same is true of alfalfa lands in vicinity of Ranch #2.

It is advised to take soil samples from various fields periodically to determine available phosphate status. This information can be helpful in planning fertilizer treatments.

With potatoes and horticultural crops both nitrogen and phosphate applications will likely be required. The application dependent upon soil condition and nutrient needs of specific crops.

All manure produced should be spread on the irrigated land. An 8 to 10 ton application per acre is advised. Do not spread thinner over a large area.

On the wet native hay meadows an application of 75 to 100 pounds of actual nitrogen per acre is advised on a trial basis in the better grassed areas. This being an alternative practice until action is taken on point (d) following.



(c) Soil Analysis

Fields should be sampled periodically to determine organic matter and phosphate availability status. Submit samples to Chemistry Research Department, Bozeman, Montana, with a questionnaire, giving cropping history, etc., with each sample. Contact local county agent for procedure of sampling and handling.

(d) Wet Meadow Lands

If a detailed drainage study has not been conducted by the Soil Conservation Service this should be done. Adequate drainage with water control will permit cultivation and reseeding to more productive forage crops.

Following drainage the heavy sod can best be worked up with a heavy duty roto-tiller. The land to be cropped two years to a small grain (oats or hay) prior to seeding down to legume and/or grass.

(e) Irrigated pasture

Drainage may also be a factor with these lands. Productivity may be temporarily increased by split nitrogen applications. Fifty pounds per acre of actual nitrogen being applied in early spring and 50 pounds July 15 to 20th. Such fertilization treatments being dependent upon use made of pastures. By temporary fencing rotation grazing may be possible. Such areas may be used to condition cattle for slaughter.

(f) Potentially cultivated irrigable land

An estimated 600 acres has been mapped as potentially cultivated land pending water development. This is limited to 2 fields. Both areas should be carefully examined as to stoniness, soil depth and water holding capacity prior to development.

(g) Horticultural production

Production of potatoes and other horticultural crops will be limited to those irrigated fields in vicinity of the headquarters. Particularly those fields to the east. These soils are best adapted in addition to longer freedom from frost injury.



### C. Horticulture

Twenty-three acres of vegetables are currently grown on leased land north of Deer Lodge and sixty-four acres of potatoes are grown at Ranch No. 1. At the present time the vegetables grown are mostly for fresh use or fresh stored. Potatoes are stored and are available throughout most of the season. At the present time there is a surplus of potatoes and some of these are sold on the table stock market and some are used for livestock feeding.

The Horticulture Department makes the following recommendations:

1. Plan on the production of vegetables on approximately 25 acres, increasing the acreage to 40 as canning and processing facilities become available. Include some small fruit in the planting plans.
2. Consider moving the vegetable growing area to Ranch No. 1. There are indications that the soil in the present area is not well drained and that possibly a salinity problem exists.
3. Construct a 25 x 100' plastic greenhouse on Ranch No. 1 for the purpose of growing transplant vegetables. Provide necessary head-house facilities, and plan to allow for possible addition of more units.
4. To cut out certain menial tasks, purchase labor-saving equipment such as: mechanical washers and peelers for potatoes, carrots and beets mechanical shelling equipment for peas and dry beans.
5. The selection of recommended varieties of vegetables and small fruits has important bearings on the success of gardening enterprises in Montana. The need for designating specific varieties and often strains of kinds of vegetables is emphasized. Procurement of seed from a reliable source is important. When bids are placed for seed, the state purchasing agent should cooperate to the fullest extent in securing the varieties and strains asked for and not making substitutions.
6. It is desirable not to grow more potatoes than can be used by the three institutions in the area. The Deer Lodge Valley is an important potato seed producing area and competition with local potato growers should be kept to a minimum. An acreage of 25 to 30 acres should be ample to supply the three institutions at the present population figure.
7. Use high quality certified potato seed and change this seed at least every other year.
8. Develop canning and/or freezing facilities for the preservation of fruits and vegetables in connection with the construction of a general purpose processing building.



9. Grow vegetables and small fruits that give the best per acre return. Maintain a small test plot for trying out new varieties of vegetables and fruits now grown, and for trying out new vegetable and fruit crops.

First Priority Vegetable and Fruit Crops:

<u>Crop</u>	<u>Use</u>
Asparagus	fresh, frozen
Snap beans	fresh, frozen, canned, dry (field type)
Table Beets	fresh, stored, canned
Cabbage	fresh, stored, canned (kraut)
Carrots	fresh, stored
Onions, dry	fresh, stored
Parsnips	fresh, stored
Peas	fresh, frozen, canned, dry
Potatoes	fresh, stored
Raspberries	fresh, frozen, canned
Radishes	fresh
Rhubarb	fresh, frozen, canned
Rutabagas	fresh, stored
Strawberries	fresh, frozen, canned
Spinach	fresh, frozen
Turnips	fresh, stored

Second Priority Vegetable Crops:

Broccoli	fresh, frozen
Cauliflower	fresh, frozen
Kohlrabi	fresh
Lettuce, head	fresh
Onions, green	fresh

Vegetables suggested for trial only:

Sweet Corn - Cucumbers - Peppers - Pumpkins - Squash (summer & winter)  
Tomatoes.

10. Follow cultural practices that will produce maximum yields. Some of the practices that will be important are:

- a. Preparation of the soil and maintaining organic matter level
- b. Maintaining fertility
- c. Insect, disease and weed control
- d. Proper irrigation methods
- e. Use of adapted varieties
- f. Recognizing special requirements needed for certain crops.



## D. Weed Control

Recommendations are made for weed control in general rather than control of weeds in specific fields or control of specific weeds. It is suggested that Montana Experiment Station Circular 210, "Weed Control In Montana," be used as a guide for specific weed control methods and recommendations.

### 1. Crop Rotation

A recommended crop rotation including a legume and a row crop would alleviate much of the present weed problem in irrigated fields now in crop. Corn grown for silage is a possible row crop. Alfalfa is already being used, but no definite rotation is being followed.

### 2. Timeliness of Operations

Timeliness of cultivations and spraying operations should be practiced. For effective use of 2,4-D and other herbicides for controlling annual and perennial weeds, spraying must be done during the correct growth stage of the plant. It is also necessary that grain crops be sprayed at the right stage of growth if a favorable kill of weeds is to be obtained, without injury to the grain. Wheat and barley should be sprayed with 2,4-D as soon after reaching the 5 leaf stage as possible. Perennial weeds are much more difficult to kill as they grow beyond an early bud stage of growth. Annual weeds are killed most readily in the seedling stage. Oats are less tolerant to 2,4-D and should not be grown in areas infested with perennial weeds.

### 3. Spraying

Two spray units should be available throughout the growing season to properly spray, at the right time, the areas that should be treated. This would include much of the hay meadows, pastures, waste lands, ditch banks, reservoir banks, and roadsides, in addition to the grain crops. Because of the many miles to cover and long distance between farms, it is suggested these spray units be "Jeep" mounted. They should be equipped with a 20 or 30 foot boom for field and roadside spraying and with a handgun for spot spraying or spraying ditchbanks. They should be equipped with a 200 gallon tank and should be used for weed spraying only. They should be available for use by May 15th. Two men are required with each spray unit. Crop and weed spraying and management of these sprayers should be a full time job from May 15 until September 1 or later for the four men assigned to this work. When weather conditions are not favorable for spraying, time can be spent maintaining equipment and locating weedy areas or crops to be sprayed.

2,4-D should be used on crop land at a rate of 3/4 pound of 2,4-D acid in at least 10 gallons of water per acre. In pastures, along roadsides,



ditch-banks and waste lands 3 pounds of 2, 4-D acid should be used per acre in at least 25 gallons of water per acre. Equipment should be accurately calibrated so the operators know what rates of chemical they are applying. Cropland areas heavily infested with Canada thistle should be cultivated for at least one year using a "duckfoot" type cultivator with good overlap of the shovels. Cultivations should be made from June 1 til freeze-up at intervals of not more than 21 days. The following year the field should be seeded to wheat or barley and sprayed with 2, 4-D

Where tillage is not desirable repeated applications of 2, 4-D will be necessary for several years to eradicate Canada thistle and other perennial weeds.

In areas where a crop is presently not growing because of a particular soil condition grass should be established and 2, 4-D should be used as recommended to control the weed infestations.

## E. Irrigation

### 1. General Information

#### a. Irrigated Land

Cultivated land	730 acres
To be cultivated	500 (pending water development)
Hay meadows	1509
Alfalfa	1149
Pasture	<u>386</u>
Total under irrigation	
	3774

#### b. Storage Water

Upper Taylor Reservoir	290 acre feet
Lower Taylor Reservoir	30
Kern	60
Mud Lake	50
Conley Lake	40
Tin Cup	80
Powell	<u>50</u>
Total	
	600 acre feet

#### c. Water Rights

Report Rock Creek area, Powell County, State Engineer's Office, Water Resources Survey shows water rights in the amount of 2, 825 miners inches from Rock Creek, Tin Cup, Willow Creek.



Dempsey Creek	2nd right	174 miners inches
	3rd right	100 miners inches
	8th right	50 miners inches
	15th right	200 miners inches
Race Track	27th right	200 miners inches
	29th right	150 miners inches

The above rights on Race Track Creek amount only to a flood right.  
Cut off date in 1958 was June 10.

d. Sprinkler Irrigation

Approximately \$30,000 was invested in pipe and motors in 1957. These systems were designed to be used on the following fields.

<u>Field</u>	<u>Acreage</u>	
I-48	91	Gravity sprinkler system with output of 600 g. p. m. designed for 150 acres (oats grown 1958)
I-37	64	400 g. p. m. system powered by 20 h. p. electric motor (potatoes grown 1958)
I-28A	20	Gravity sprinkler system 4" line output of 185 g. p. m. (not planned to be used in 1958)
Land north & east of Ranch #1 headquarters	157	Gravity sprinkler system 8" pipe 610 g. p. m. designed for fields east of 28A. Water must be transported to sprinkler pipe through 6,700' of ditch (not planned to be used in 1958)
Hog Farm	70	Sprinkler system powered by gasoline engine, 600 g. p. m. output (not planned to be used in 1958)

e. Well

Well drilled west of Security Unit in 1957.

Depth	200'
Static head	30'
Casing	12"
G. P. M.	200

f. Weather Data

The following data was supplied by R. A. Dightman, State Climatologist, Weather Bureau, United States Department of Commerce.



Mean Total Precipitation (Period 1931 - 1955)

Station	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Deer Lodge	.40	.33	.54	.65	1.52	2.21	1.21	.79	.93	.64	.55	.51	10.28
E. Anaconda	.73	.66	.93	.86	1.60	2.40	1.20	.93	1.22	.85	.82	.79	12.99

Length of Season (30 year Period) - Deer Lodge

Critical Temperature	Average Date, Last Spring Occurrence	Average Date, First Fall Occurrence	Average Number of Days Between Dates
32°	June 4	September 7	95.1
28°	May 16	September 19	126.1
24°	May 3	September 30	150.6
20°	April 13	October 15	184.9
16°	April 9	October 27	201.0

Standard deviations (days) Spring 14.2 Fall 14.0

East Anaconda

32°	May 28	September 21	116.1
28°	May 10	October 6	148.3
24°	April 22	October 18	179.4
20°	April 9	October 24	198.3
16°	April 1	November 4	216.6

Standard deviations (days) Spring 13.9 Fall 16.0

"A brief comment on these data may be helpful. East Anaconda is located at the Anaconda Plant well up the side of a substantial hill. There is no doubt that the picture in the valley below the plant would be very similar to that shown for Deer Lodge. No doubt you are familiar with the meaning of the standard deviation. Within two standard deviations, of course, we could expect about 95.45 percent of the occurrences to be included over a long period of time - assuming no change in exposure and no change in general climate characteristics. For last date in spring 32° occurrences at Deer Lodge, for example, we could expect 95.45 percent to occur within  $\pm$  14.2 days of June 4. Statistically speaking, distributions of freeze dates are essentially normal."

2. Recommendations regarding Irrigation Practices and Present Water Supply

- Water measuring devices should be installed immediately on all ditches supplying water to prison lands and an accurate record kept on time and amount of water delivered. This information is needed in planning for future irrigation development and improving irrigation practices.

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Water conveyance losses in ditches should be determined by water measurement to establish whether there is a need for ditch linings. (Concrete blocks made at the prison could be used in these structures.) The Parshall flume is recommended as the most satisfactory measuring device.

- b. Water control structures such as drops, checks and turnouts are needed to control erosion on ditches. These structures are badly needed to control the water so that the land can be covered uniformly and the limited water supply used more efficiently. (Here again concrete, concrete blocks and rubble masonry could be used.)

Ditch following along south side of field I-17 is an example of one needing drops and turnout structures. Ditch along north side of field I-24 is an example of rock fill needed to correct existing erosion before drop structures can be installed. Siphon structures are needed on water supply lateral at dairy farm.

- c. Lining of reservoirs and ditches can reduce storage and conveyance losses. Clean ditches will reduce conveyance losses, too.
- d. Production of quality forage is limited on several fields because of an apparently high water table. Soil Conservation Service should be contacted to make a detailed drainage investigation and a plan for drainage. Examples of fields with high water tables include I-16, I-72 and I-20.
- e. On lands not sprinkler irrigated, land water distribution systems can be improved through ditch reorganization and land planing and leveling where soil depth, topography and texture permits. Soil Conservation Service should be contacted for technical assistance through the local Soil Conservation District.

### 3. Recommendations Regarding Supplemental Irrigation Water Supply

- a. Present stream flow records are insufficient to determine how much supplemental water is needed to develop prison irrigable lands to the maximum potential. Additional stored water would mean a season long supply for lands presently irrigated and the development of additional lands not now irrigated. Sources for additional water have been briefly investigated by the State Water Conservation Board. (See letter from R. A. Fifield, Chief Engineer, State Water Conservation Board to Warden F. O. Burrell dated December 28, 1954.) A stream gaging station was established on Race Track Creek by U.S.G.S. in 1957. Stations installed on other west side streams in the Deer Lodge Valley would be desirable in securing additional stream flow data for making long-time plans.

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Possibility of diverting runoff water from Tin Cup to reservoir on Taylor Creek should be investigated.

Legal aspect of diverting flood water from Dempsey Creek to Powell Creek reservoirs and drainage should also be investigated.

- b. Ground Water Branch, U.S.G.S., Billings, should be contacted to determine the availability of ground water as a source for irrigation.
- c. Assistance from all agencies engaged in water development should be helpful in determining the best method of obtaining supplemental water. Agencies contacted should include the State Water Conservation Board, the Soil Conservation Service and the U.S.G.S. The Bureau of Reclamation has also made some preliminary planning studies in the Deer Lodge Valley concerning supplemental water which may be helpful.

#### 4. Recommendations Regarding Weather Data

The variation in elevation over the ranch coupled with the difference found in the vegetative growth and plant species would indicate a wide variation in climatic factors that affect plant growth. The weather station at Deer Lodge probably doesn't reflect accurate climatic conditions at the prison ranch so a weather station should definitely be established in the vicinity of the new Security Center that is under construction.

Additional weather stations are also suggested for the following locations:

Sec. 33 T8N R10W  
Sec. 22 T7N R10W

#### F. Range Management Recommendations

The following are recommendations for range management practices for the prison ranch.

##### 1. Handling of Livestock

It is recommended that the present system of handling the cows with calves, the dry cows, and the steers and heifers be continued, except for making greater use of pasture R4 prior to the National Guard encampment period.

##### 2. Stocking Rates

It is recommended that stocking rates for the ranch be 1400 animal units until range improvement practices become productive, and at the following equivalents:



	<u>Animal Unit Equivalent</u>
Cow (w/calves) in summer	1.0
Heifers (yearlings & two-year-olds)	.7 (.6 & .8)
Bulls	1.25
Steers (yearlings & two-year-olds)	.6 (.6 & .8)
Horses	1.5
Sheep	.2

The present range resource should carry 1400 animal units for seven months per year. This includes use of national forest grazing permits.

Suggest cattle only for 3 years, at least. Consider feasibility of band of 500 to 800 sheep or the equivalent in other stock or work horses when increased carrying capacity will support it.

This rate of stocking is strictly tentative and is largely on past history of experience, and partly on present range condition.

Range condition and trend should serve as the bases for adjustments in the future. For this purpose 20 to 25 transect clusters should be established to accurately determine trend of range condition and production. The local County Extension Agent and Extension Range Specialist can be of assistance in establishing the transect clusters.

Continuing reductions of national forest grazing permits and of livestock carrying capacity of deeded lands contiguous with national forest areas (R5 & R20) are to be expected unless the elk herd using the area is limited to present numbers by hunting. The present condition of this is evidence that past grazing pressure has been too heavy. Elk and cattle are in a large measure directly competitive for forage. Hunting should be encouraged by any legal means available in order to hold this herd within present limits. Unless this is done, improvement of forage resources at the low elevations will probably do little more than replace forage lost to elk and livestock numbers cannot be increased.

### 3. Fall, Winter and Spring Range Development

Develop small Class III and IV cropland areas near Ranch No. 1 for calving pasture. (Plant crested wheatgrass on dryer areas.)

Seed Class III land west of road in R22, 24, 25 and 26 to intermediate wheatgrass, green stipa alfalfa mix for use as late spring - early summer pasture.

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Utilize R7 and adjacent cultivated areas (aftermath of hay) for fall grazing for slaughter and feeder stock or for spring range following calving.

Utilize R23 and cropland aftermath east of road in R26 for late fall and winter pasture for cows.

#### 4. Fencing

If not present - the west fence of R3 should be constructed or at least some sort of a barrier or system should be provided as needed to preclude drift of stock westward beyond Sections 6, 7 and 18 Range 10 West Twp. 8 North.

Fence out cropland I-1 and I-2 (to be seeded and grazed as a unit, possibly for early use and pasture breeding).

Repair or reconstruct fence along north side of I-3 to facilitate grazing of meadow during late May through June. (200 AUM)

Install electric fence around fields I-7, I-8, I-9, I-10, I-11, I-13 and I-14 and possibly other such areas to facilitate grazing of interspersed range.

Re-align fence around I-16 to include all of this field and I-15.

R24 upper part of Lower Powell pasture. Fence east side permanently. Include water in bottom of northeast corner. Use pastures R24 and R25 as a unit.

#### 5. Stockwater Development

Develop spring in R1 (NE 1/4 of Section 29 Range 10 West Twp. 9 North) north pasture. Pipe to drain equipped trough.

Develop stockwater in R25 and R26.

Make water available in other areas at locations within 1.5 miles of any substantial acreage of range.

#### 6. Salting Plan Revisions

R1 - New salt stations near center of north fence Section 20, northeast corner of Section 32 Range 10 West Twp. 9 North.

Remove salt stations above eroded slope E-1/2 Section 31 and W-1/2 of Section 32 Range 10 West Twp. 9 North.

R21 - Move salt station in W-1/2 of Section 10 to northwest corner of NE-1/4 of Section 9.



Establish salt stations in other pastures as needed to obtain uniform use of herbage.

#### 7. Seeding Cropland to Pastures

I-1 and 2 - Seed I-1 and I-2 to intermediate wheatgrass.

R4 - Cultivate and reseed depleted crested wheatgrass fields in R4. (Boger pasture.)

R4, R5 and R6, I7, 8, 9, 10, 13, 14 and 15 - Devote to hay production and graze aftermath in fall with feeder or slaughter animals. Pick rocks in these fields. Install electric fence to facilitate grazing of interspersed rangeland. Alternative: Seed all the above areas, dispense with fencing mentioned and seed all to Russian wildrye. Use for fall pasture for feeder or slaughter animals.

Seed available dryer areas of cropland in the vicinities of Ranch No. 1 and No. 2 to crested wheatgrass for use as calving pastures.

#### 8. Roads, Trails and Forest Grazing Land

Prepare access trails through timbered areas into open grasslands, parks in semi-timbered sections along west side of ranch. (East 8 miles)

Clear cutting strips in dense timbered areas to increase available forage for livestock. This is to be done in accordance with proper forest and watershed management practices.

#### 9. General

Maintain close observation of cattle when initially grazing National Guard shall impact areas.

Adjust stocking rates to allow for destruction of vegetation due to shelling and disturbance of stock during artillery practice.

Install fly and lice control rubbers on all summer and fall grazing areas.

### G. Forest Management Plan

#### 1. Objectives of Management

- a. To merge the work of growing and harvesting forest products into the regular farm or ranch plan.
- b. To build up the stocking and growth of the timber to the full capacity of the site.



- c. Provide an adequate amount of forest products for ranch use, such as lumber, fence posts, fuel wood, etc. and also furnish forest products for other state institutions if proper arrangements can be made.
- d. Maintain a reserve of timber on the ranch for emergencies, such as replacing or helping to replace ranch buildings destroyed by fire or other causes or for constructing new buildings.
- e. To develop and maintain favorable food and cover conditions for game and wildlife.

2. Description of the Timber, Area, Volume and species.

- a. The majority of the timber on the Prison Ranch is in urgent need of some type of forest management such as thinning, pruning and harvesting of mature, overmature and cull trees.

(1) Area:	Sec. 31	T9N	R10W	181.0 Acres
	Sec. 6	T8N	R10W	185.0 Acres
	Sec. 8	T8N	R10W	392.5 Acres
	Sec. 17	T8N	R10W	185.0 Acres
	Sec. 5	T8N	R10W	25.0 Acres
	Sec. 18	T8N	R10W	2.5 Acres
	Sec. 19	T8N	R10W	612.5 Acres
	Sec. 20	T8N	R10W	277.5 Acres
	Sec. 29	T8N	R10W	172.5 Acres
	Sec. 31	T8N	R10W	685.0 Acres
	Sec. 32	T8N	R10W	460.0 Acres
	Sec. 5	T7N	R10W	487.5 Acres
	Sec. 7	T7N	R10W	442.5 Acres
	Sec. 18	T7N	R10W	112.5 Acres
	Sec. 17	T7N	R10W	522.5 Acres
	Sec. 19	T7N	R10W	290.0 Acres
	Sec. 20	T7N	R10W	7.5 Acres
	Sec. 16	T7N	R10W	7.5 Acres
	Sec. 21	T7N	R10W	<u>2.5 Acres</u>
		Total		5,051.0 Forest Acres

- (2) Volume. Several 1/5 acre plots were sampled for average volume of timber per acre. These plots showed an average volume of 4,000 board feet/acre in the areas covered by Douglas fir and Lodgepole pine where the trees were 6" DBH (Diameter breast high) and larger. In the area covered by thick stands of Lodgepole pine, where the trees are so thick they have become stagnate, the sampling showed 1,720 trees per acre in the 2" - 8" DBH class. The majority of the trees sampled were in the 4" - 6" DBH class. Trees in this class are ideal for fence posts and corral railings.



- (3) Species. The majority of the timber on the Prison Ranch is made up of Douglas fir with small patches of dense stands of Lodgepole pine.

### 3. Care and Maintenance of the Timber Resource

#### a. Thinnings and Improvement Cuts

It is desirable, from a forest management standpoint, to make frequent light thinnings. However, from a practical standpoint, it is desirable to delay thinning until merchantable material, usually small sawlogs, corral railings, or fence posts, can be removed in the operation for use on the ranch.

#### b. Pruning.

It is sound forest management to bring the trees to a merchantable sawtimber size at the earliest age and at the same time have a maximum of clear wood. To obtain this clear wood, artificial pruning may be necessary.

The following guides will apply to the timber on the Prison Ranch:

- (1) Prune at least 100-125 vigorous straight dominant or co-dominant trees per acre.
- (2) Limbs should not be removed, ordinarily, above one-half the tree height.
- (3) Trees should be pruned to one-log height (17'). This height will furnish a clear 16 foot saw log with one foot for trim. If the trees are shorter and a pruning up to 17 feet will not leave the required amount of live crown, it will then take pruning operations.
- (4) Saws are the most satisfactory tool for pruning operations. Axes, machetes or clubs definitely should not be used.

### 4. Marking Timber For Harvest.

Tree marking and an accumulative record of volumes to be cut are guides designed to keep the volume to be logged within the growth capacity of the land. Tree marking is the most effective way to assure good forest management. Light, selective cuts are repeated at short intervals to remove high risk trees (trees that show loss of vigor which is indicated at the crown of the tree).



Principal factors that must be kept in mind when marking timber for harvest:

- a. Maintenance of a strong stand of commercial growing stock.
- b. Tolerance of trees.
- c. Thrift and vigor.
- d. Defect and rot.
- e. Species.
- f. Site quality (land capability).
- g. Spacing of trees.
- h. Stocking of stand.
- i. Quality of products obtainable.

## 5. Logging

Factors to consider before logging is started:

- a. Map the area roughly, showing the topography and extreme variations in stand density.
- b. Lay out a permanent road system designed so it can be used for other uses such as fire control and managing livestock. Include log landings, main skidding trails and turn-arounds. Existing road system to be corrected where necessary. Avoid locations which will result in excessive run-off and erosion.
- c. If plans call for the purchase of a portable sawmill, then the entire logging road system should be planned with this in mind.
- d. Trees should be cut up into the highest grade logs possible and yet fully utilize the commercial length of the tree. This means that the log lengths should be measured out for the whole tree in advance of sawing out the logs to obtain maximum quality.

## 6. Present Needs for Forest Products on the Prison Ranch

At the present time there are 75 miles of fence. With posts placed 12 feet apart they have 33,000 fence posts in use. Currently posts are not being treated with a wood preservative. A life of 3 - 5 years for an untreated post can be expected while a treated fence post will last from 20 - 35 years. New buildings, feed lots, cattle guards, bridges, corrals, headgates, culverts, flumes and the like are necessary in the development of the Prison Ranch. Ranch grown forest products can be extensively used in the development program as well as for repairs later.

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## 7. Recommended Machinery Purchases

Fence post peeling machine (this can be made at the Prison.)

Fence Post Pointing Machine (this can be made at the Prison.)

Wood preservative treating plant (for treating of posts, timbers and lumber.) For plan consult the Extension Forester.

Portable sawmill, planes and edger.

Approximately \$6,000 would be an adequate amount to handle the machinery recommended.

## H. Beef Cattle Recommendations

This report deals with the general management of the beef cattle enterprise on the prison ranch. It does not account for daily operations or specific production problems because a capable manager will not need detailed instructions of this nature. Livestock specialists at the college will be available for consultation on problems arising in normal operations

Sheep production is not proposed for the present because there is no actual need for lamb or raw wool. In the future small numbers of sheep may be added principally for weed control.

### 1. Beef Requirement

Fiscal 1957-58 information (approximates): 166,000 lbs. of beef produced, slaughtered and used by Prison inmates, employees, guards, and staff; 316 head of cattle. The per capita consumption is 241 lbs., based on population varying from 682 to 720.

Budget requirement for future: Based on population of 720 @ 240 lbs. per capita (one-half pound for inmates inside, one pound for all others) 172,800 pounds of beef per year are consumed. Three hundred and thirty two head (332) at 1,000 lbs. live weight x 52% yield totals 172,640 pounds.

Veal slaughter is advised against as inefficient unless the 4-months-old dairy steers can be more economically handled for that purpose.

### 2. Cow Herd Management

Calving begins around March 25 and continues until finished. Within 5 years breeding and calving should run 9 - 10 weeks and no longer.

Cows should be full-fed on good quality hay, 30% legume, beginning March 10. No concentrate should be fed except to "hospitals".



Three-year-old heifers should be fed and calved separately from main herd; no other special attention is needed. Future operations of first calving by two-year-olds should be given very special attention. Vaccinating and de-horning should be carried out as recommended by the designated Deputy State Veterinarian.

Turn bulls out with the cow herd June 20 and they should be taken up not later than September 1. As plans progress a 65 day breeding season is recommended. Two-year-old heifers should go into the cow herd prior to June 20.

Wean all calves about November 1.

Graze cow herd out as long after weaning as weather and range conditions permit, probably until after January 1 except for older or thinner cows. No concentrates are to be fed.

All hay should be fed on the ground, moving feeding areas frequently for sanitation.

Winter feeding on meadows along brush: Feed lowest quality hay during January (December as necessary), and February only. Better quality hay containing some legume beginning March 1. Continue taking out "hospitals" as needed during fall and winter.

"Hospitals" should be kept in small pasture near headquarters, full-fed good quality grass-legume hay in racks, 50#-50# mixture of oats-barley (coarse ground), only, as needed.

### 3. Weaner Calf Management

Provide weaning pens of not more than 200 head capacity each. Wean directly into pens and feed high quality hay low in legume for one week. Maintain a 24-hour watch on calf-health for entire week. Switch gradually to alfalfa hay of best quality. Full feeding of hay reached in about 3 weeks. No concentrates should be fed to weaner calves.

Dehorn and vaccinate during second week or as soon as calves are settled down and eating well. Consult designated Deputy State Veterinarian. (Vaccination prior to weaning may be recommended).

Sort all calves according to size and thriftiness as soon as dehorning recovery is assured. Full-feed best alfalfa hay all winter to all thrifty calves. If hay quality falls off so that 3/4 to 1 lb. gain is not obtained, supplement with 2 - 4 lbs. of whole oats, fed in bunks. Maximum concentrates fed are about 4 lbs. per head per day.



Hay silage should be reserved and preferred for these weaner calves. Feed up to 6 lbs. /head/day. Convert 1 lb. hay to 3 lbs. silage for feed budgeting.

Supplement small, backward lot of calves with whole oats as needed, up to 6 lbs. per day, to bring them into thriftiness.

Hold yearlings on feed in the spring until new grass is well started.

From 75 to 100 head of dairy steer calves will be delivered annually from the dairy enterprise. Their age will be about 4 months. Carry them on an adequate calf growing ration, either in a calf lot or small pasture until 8 months old, then turn them in with beef cattle of like size and/or age.

#### 4. Yearling Management

Run all yearlings together, separate from the other cattle, for entire year after first turning-out time. They can be wintered at the Hagen Ranch.

Off-sort all coming two-year-old heifers not required for replacement in January. Put off-sorts in beef pens and feed them for the spring meat supply.

Feed all replacement heifers and all yearling steers during entire winter so as to maintain their fall weight. All two-year-old heifers are to be turned with the cow herd at turning out time in the spring.

#### 5. Two-year-old-Steer Management

Run with cow herd unless separate range can be provided.

Gather as needed for slaughter off grass.

#### 6. Bull Management

Work out sire procurement plan with Department of Animal Industry, Montana State College, if possible.

Furnish five bulls per 100 cows during breeding season.

Turn out only two-year-old bulls and older. Run each bull for four years or as long as good breeding performance permits. Buy long-yearling bulls each fall as needed for replacements the following June. A quality grade of 2 average is recommended with a Gain Index of 110 or higher. (Consult Extension Livestock Specialist).

Carry all bulls together and separate from all other cattle except when they are in service. The bull pasture and the winter feeding station should be removed some distance from any other cattle.



Feed bulls hay only for wintering, in enough quantity so that they clean up their feeding ground fairly well by the next morning. Remove young bulls, or others which become unthrifty, as needed and full-feed with hay only in a corral or lot.

Slaughter cull bulls only if a storage freezer is provided, otherwise sell through regular market channels.

#### 7. Beef Pens

Provide three feed-lots for conditioning cattle for slaughter during January through June.

Feed for recommended slaughter grades only, no higher.

Consult the Animal Industry Department and the Extension specialist on rations, supplements, additives, minerals, etc. Perfect a Beef Pen routine which provides the required slaughter supply.

#### 8. Health, Immunization and Sanitation

Maintain continuing contact with designated Deputy State Veterinarian and carefully follow his program.

#### 9. Slaughter Cattle

Grass beef will be used in preference to any other from July through most of December. Standard grade steers and heifers, Utility and Commercial beef cows.

Cutter and Canner cull cows from the dairy, and no veal, will be the most suitable grades.

Good grade and higher will not be needed.

1,000 pound live weights will be most efficient for steers and heifers, within practical variations. This requires them to be from 2 to 2-1/2 years old. The cow-weights will vary from 900 to 1200 pounds alive.

#### Slaughter Schedule -

July, August, September, October and November - dry cows, mostly Commercial

December, January, February - coming 3-year-old steers.

March, April, May, June - Off-sort 2-year-old heifers.

All the above at the average rate of 28 head per month - 336 head.



Surplus cattle to be slaughtered and disposed of under conditions decided by the respective administrators.

Class and Kind	Slaughter Cattle Available					
	Total No. Head		Prison Use	Other Institutions		
	Present Capacity	Full Capacity		Present Capacity	Full Capacity	
Dry cows, Hereford	120	240	100	20	140	
2 & 3-year-old steers (incl. 100 Holsteins)	340	580	141	199	439	
20-26 month-old heifers (Off-sort Herefords)	95	190	75	20	115	
Cull Holsteins	<u>20</u>	<u>20</u>	<u>20</u>	<u>0</u>	<u>0</u>	
Totals	575	1030	336	239	694	

In addition to the above, there may be a few cull bulls. The indicated disposal above is merely illustrative. The kinds of beef can go to any institution according to the needs. Budgeting the assumed Prison use was the purpose in arriving at these figures.

#### 10. Slaughter Facilities

The slaughter house is well equipped for slaughter operations and appears adequate. The cooler space is too small and the room at the east end in the basement is waste space. Immediate improvement would be more thorough cleanliness. Sawdust should be eliminated from the cooler floor. It can be kept clean by weekly scrubbings of hot water and a good sudsless detergent.

The practice of storing and salting hides from cattle slaughter should be discontinued and the hides sold green.

##### a. Recommendations for Future Improvements

Build a freezer for the storage and better utilization of fresh pork cuts like spare ribs, neck bones, hocks and variety meats. This freezer could be built in the basement room now used to park a truck during slaughter for offal disposal. The offal could be chuted out through an opening in the wall to a truck. A freezer could be built in this room and the entry way enlarged slightly and enclosed for a small cutting room to break hog carcasses and beef quarters.

Future development should include facilities for curing and smoking hams, bacons and lard rendering. As much complete meat processing as possible should be carried out at the prison slaughter house, as this could utilize more labor and it would also be excellent rehabilitation experience.



The installation of a freezer can be in conjunction with a freezing and storage plant for the better utilization of horticulture products.

In planning future expansion of the slaughtering facilities, a competent engineering firm with experience in designing such establishments should be consulted along with consultation of personnel at Montana State College.

Beef Cattle Classes and Feed Requirements  
Present Capacity

<u>Cattle Classes</u>	<u>Grazing Season</u>			
	<u>Animal</u>	<u>No.</u>	<u>No.</u>	<u>Total</u>
	<u>Unit</u>	<u>Months</u>	<u>of</u>	<u>A. U.</u>
	<u>Rate</u>	<u>Grazed</u>	<u>Head</u>	<u>Months</u>
Breeding females:				
Cows and calves	1.0	6.0	480	2880
Cows - after weaning	0.8	1.5	480	576
Dry cows 1/	0.8	3.0	120	288
Two-year-old heifers	0.8	7.5	145	870
Weaner calves	-	-	480	-
Bulls	1.2	8.0	30	288
Yearlings:				
Steers & heifers, Hereford	0.6	8.0	480	2304
Steers, Holstein	0.6	8.0	100	480
Two-year-olds:				
Steers, Hereford 1/	0.8	7.5	240	1440
Steers, Holstein 1/	0.8	7.0	100	560
Horses 2/	1.5	3.0	20	<u>90</u>
			Total Required	9776
			Total grazing resource (Range Committee)	9800

Cow numbers have been adjusted for a yearly death loss of 25 head.

Twenty (20) head of Holstein Canner and Cutter cows from the dairy will not be grazed but slaughtered on delivery.

1 / Grazing season length has been adjusted to compensate for slaughter off grass.

2 / Grazing season length has been adjusted to compensate for time horses are in use and off the range. Allowance is mostly for winter grazing.



Beef Cattle Classes and Feed Requirements (cont'd.)  
Present Capacity

	Winter Feed Requirements			
	No. of Head	Months Fed	Lbs. Per Day	Total Lbs. Hay (000)
Mature breeding cows	480	4.5	20	1,296.0
Two-year-old heifers	145	4.5	20	391.5
Bulls	30	4.0	32	115.2
Weaner calves, steers and heifers	480	6.5	13	1,216.8
Yearling steers and heifers, (100 Hostein)	580	4.0	14	814.8
Horses	20	9.0	30	162.0
			Total Lbs. hay	3,996.3
			Total Tons	1,998

Beef Pen Feed Requirements  
Present Capacity

Cattle Classes

Steers and heifers 270 head x 40 days = 10,800 days

10,800 days: -

Barley @ 6 lbs. per day = 32.4 tons

Oats @ 2 lbs. per day = 10.8 tons

Hay @ 16 lbs. per day = 86.4 tons

Feed barley and oats mixed, coarse cracked.

Substitute hay silage (up to 6#/day) at 3# silage = 1# hay

Salt only - no other minerals.

I. Dairy Cattle Recommendations

The prison farm dairy is unsatisfactory and was producing milk of below standard quality from a sanitary standpoint. The outdated buildings and equipment are largely responsible, although conditions could be improved by better management. There is some mastitis in the milking herd. Calf mortality was high and was apparently caused by unsanitary conditions and overfeeding.

Records inspected showed a loss of approximately \$3000 per month for the dairy operation.

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The following are recommendations for improving the operations of the dairy enterprise.

1. Sell or otherwise dispose of the dairy farm.
2. Combine the Dairy Herd of the Prison with that of Warm Springs.

It is recommended that the dairy of the prison be combined immediately with the dairy herd at Warm Springs. There, milk would be produced under the supervision of a competent herd manager; it would be produced under more sanitary conditions; and it would be a safer milk for the consumption of the patients and prison inmates. The dairy operation would be operated more efficiently, and the facilities at Warm Springs would be used nearer to capacity.

The dairy at Warm Springs consists of approximately 110 milking cows under the direct supervision of a competent manager. The dairy production buildings are very adequate in size and construction. The milking parlor is a modern, sanitary structure with a pipeline milker equipped with automatic cleaning facilities. This milking parlor is not being used to capacity. If 50 to 60 cows were moved from the prison and combined with the Warm Springs herd, enough milk could be produced to supply the needs of the hospital at Warm Springs and the hospital at Galen, as well as the needs of the prison.

The outlay required to combine these two herds at Warm Springs is quite low. Warm Springs needs a 2,000 gallon refrigerated bulk milk tank to hold the milk and process only three times a week. Also, a temporary loafing shed for dry cows would be needed to release a permanent shed near the milking parlor for use by the additional milking cows. The equipment such as the ice cream freezer, churn, etc., could be moved from the prison to Warm Springs.

### 3. Improvement of Dairy Enterprise

With the combined herd at Warm Springs, one of the first considerations is a new dairy plant. Plans have been drawn and necessary equipment planned to establish an adequate dairy processing plant at Warm Springs. Little additional equipment besides a large holding tank would be necessary to handle the dairy processing if this building, as planned, was built and equipped according to these plans. The building and equipment would cost between \$40,000 and \$50,000.

A large holding tank of 2,000 gallons capacity would eliminate processing milk daily and thus cut down operation costs and labor for processing. This refrigerated tank would hold the milk for five to six milkings and cut the days for processing to three times weekly.



One additional loafing shed is an immediate need at Warm Springs to house dry cows. One of the three present loafing sheds is used for dry cows and this shed would be used for milking cows in combining the two herds. About 3,200 square feet of shed space would be necessary for the new shed. The present calf shed is adequate for housing all of the calves from the combined herds until calves reach four months of age. At four months of age, steer calves could be moved to the prison and grown out for slaughter. Heifer calves, after four months of age, could be housed in the wood building northeast of the present calf shed which is now used for machinery storage. The holding pen adjacent to the milking barn area in front of sheds and corrals where silage and hay is fed, should all be paved to aid in cleaning corrals and improving sanitation in the dairy herd. There appears to be enough feed bunk area and corral space for the combined herd if the corrals were surfaced with concrete.

#### 4. Raising Replacements

Caring for calves and developing heifers into good size herd replacements is being practiced at Warm Springs. Steer calves as previously suggested, could be moved from Warm Springs to the prison when four months of age. Cull cows could be moved to the prison and slaughtered for additional meat supply. Skim milk for calf feeding until calves are four months of age would come from the dairy herd. This is the practice of calf raising now being followed at Warm Springs.

#### 5. Breeding and Record Keeping

At the present time cows at Warm Springs are being bred to bulls whose daughters are known to have high producing ability. Breeding records are being kept and cows are turned dry for 6 to 8 weeks between lactations. Production records are kept so daughters of outstanding cows can be selected for herd replacements. Identification of cows is such that accurate records of the herd can be kept.

#### 6. Feed for Dairy Herd

Grass and legume silage and hay grown at Warm Springs provides the roughage for the dairy herd in the winter time with irrigated pasture used for roughage during the summer. If the 80 acres of land now used for potato production was used for pasture and hay production, a considerable amount of additional roughage could be raised at Warm Springs. Additional hay necessary for the combined herds could be hauled from the prison farm, or land now in grain production at Warm Springs could be put into grasses and legumes for roughage production. If all of the roughage for hay, silage and pasture is produced at Warm Springs, then grain could be purchased or secured from the prison farm.



## 7. Calf Feeding

Skim milk can be fed to calves at the rate of 10 percent of the body weight from three weeks of age (when they are changed from whole milk feeding) to four months of age. Oats and barley (2 pounds daily per calf) plus good quality alfalfa hay should be fed in addition to the skim milk. Sanitation of buckets used for milk feeding plus sanitation of housing quarters for calves is very important in successful calf raising. Antibiotics (Aurofac 2A at 45 mg. daily) may be fed regularly in the milk to help control scours and colds in calves.

## 8. Feeding Heifers

After heifers are weaned from milk at four months of age, they should continue to receive 2 pounds of grain daily until one year of age unless they are on excellent pasture. Adequate good quality hay should be provided at all times when heifers are not on pasture. Springing heifers (two months before freshening) should be fed grain especially if they are not in good flesh. If calves and heifers are well fed, they should weigh from 1100 to 1250 pounds at two years of age. Heifers should be near 1200 in size when calving, and this can be accomplished by the time they reach two years of age if properly fed and managed.

## 9. Milk Production

Nutrition authorities recommend that 3/4 quart of milk per day per person is adequate for proper nutrition. This amount of milk can be consumed in the fluid state or used in cooking or consumed as other dairy products. The following statistics were given as the number of people that would be consuming milk at the three state institutions:

675 inmates at the Prison  
354 patients at Galen  
2000 patients at Warm Springs

3029 Total

Three thousand and twenty-nine people consuming milk at a rate of 3/4 quart per day equals 568 gallons per day or 207,320 gallons per year. This amount of milk could be produced by 156 cows producing an amount equal to the average production of Warm Springs at the present time (11,428# milk, 400# fat). It is recommended by this committee that a milking herd of 200 cows be planned for at the beginning until a more complete job of culling can be done and to insure that enough milk be produced to meet the needs of the three institutions. Any surplus milk over 3/4 quart per person can be manufactured into ice cream, cottage cheese and butter. It is also recommended that the possibilities of obtaining government surplus foods



such as dried milk and butter be determined. If it is possible to obtain these surplus items, they should be used.

Feed Requirements

Grain		Silage	Hay
Oats (bu)	Barley (bu)	Alfalfa (tons)	Alfalfa (tons)
200 Holstein Cows & 70 Holstein Heifers	11,666	16,000	876

J. Swine

1. Present swine facilities at Deer Lodge are badly outdated, substandard and virtually impossible to adapt for provision of sanitary quarters. It is recommended that all present buildings and feeders be razed and that modern sanitary buildings and feed-saving equipment be established at a new location.
2. Discussions have indicated the possibility of farrowing hogs in the present dairy barn. It is recommended, however, that a new farrowing house be built near Ranch #1 where the feeding building and feed processing plant is proposed.
3. It is recommended that the swine unit be constructed near the medium Security Building with materials fabricated largely at the prison.
4. It is recommended that the Prison Ranch unit undertake to crossbreed on a three-breed rotational crossbreeding program, buying three boars each year of a meat-type breed, using them one year, disposing of them and buying a second breed the second year, a third breed the third year, then the first breed the fourth year, etc. This would be with one physical unit described herein and would be set up to produce 650 to 900 slaughter animals per year.
5. Feeding recommendations -- It is recommended that the feeding program be entirely dry feeds because it is difficult to maintain sanitation and eliminate the disease hazard where moist feed is used. Also the quantity of garbage available at the prison does not warrant the development of adequate garbage feeding facilities.

Barley and alfalfa sun-cured hay meal are to be the basic feeds for all swine, with the degree of supplementation with protein being based on the estimated feed cost of producing each unit of pork rather than on the estimated rate of gain. All stock will be self-fed, the sows and boars receiving proper nutrients through varying percentage of ground sun-cured hay according to reproductive condition and fleshing.



- a. Pigs up to weaning time should be fed a pelleted creep feed or "starter". The saving of baby pigs, decrease in number of runts and increase in weight of pigs to weaning would more than offset the cost of the creep feed.
- b. For pigs fed to market weight, a ration consisting of barley plus a commercial 32% protein supplement is suggested. From the time the pigs are weaned until they weigh 125 pounds, they should be fed a mixture of 800 pounds of barley and 200 pounds of 32% protein supplement. Pigs weighing from 125 pounds to 210 pounds could be fed a ration of 900 pounds barley and 100 pounds of a 32% protein supplement. An alternative at this phase in the fattening program would be to feed straight barley plus alfalfa self-fed.
- c. Breeding animals are to be fed the same rations as market pigs to 200 pounds. Thereafter, they are to receive the same rations as reproducing sows. Ergot free ground barley, alfalfa meal, and minerals are to be the basic feeds for the breeding herd.

## 6. Buildings and Equipment for Completed Layout.

- a. A 20 x 50 farrowing barn at each unit.
- b. A concrete slab and shed for year-round feeding, with a scales pen at each unit.
- c. A concrete slab and shed for sows and boars at each unit.

### Cost of buildings per unit:

Farrowing barn as per MSC plan, but with stalls on each side of alley, 1000 sq. ft. @ \$8. -	8,000
120' growing barn & slab, 1200 sq. ft. @ \$3.00 -	3,600
As per MSC plan - 12 feeders @ \$100	1,200
12 waterers @ \$40	480
8 gates @ \$52.50	420
Post & Fence @ \$3 per pen	36
120' breeder barn & slab, also as per MSC plan for growing barn. Same as growing barn and equipment above	<u>5,736</u>
Total	\$19,472

Compute @ 50% of contract price using prison labor and prison-produced construction material 9,736



Description of Buildings:

Three basic swine buildings, a slab and shed for growing pigs, a slab and shed for breeding animals and a farrowing-suckling barn are recommended.

It is recommended that breeding animals as well as growing pigs be kept the year-round on concrete. This eliminates the need for field shelters, field watering facilities, etc., which would duplicate facilities on the slabs and sheds. (See MSC Plan No. 610.)

Feeders, constructed with prison labor, are to be adjustable for rate of delivery of feed. Water is to be supplied to each pen as indicated in drawings with frost proof waterers. A pressure boosting system for the water intended for flushing pens is a requirement for proper operation of the plant.

7. Production

It is recommended that pigs be slaughtered at an average of 200 pounds and that only the best sows be permitted to exceed 400 pounds before slaughter. Total carcass production at the Prison will be 650 to 850.

8. Disease Prevention

In addition to maintaining the quarantine suggested, herd health provisions and immunizations are to comply with recommendations from the State Veterinarian.

9. General Management

Transfer growing pigs to feeding slab from farrowing barn upon weaning at five weeks of age. Pigs are to receive creep feed from few days of age to weaning. Administer shots for anemia prevention at a few days of age and immunization as needed. Castrate boar pigs at four weeks of age. Castrate all boars following one year of service, beginning service at eight months of age. Butcher all but best 1/4 of sows after one litter. Plan to feed culled sows only until udder is smooth.

Self-feed breeding gilts and sows concentrates diluted in varying degrees with ground hay. Boars are run with sows except following a six-weeks exposure period when exposed sows will be placed across a fence or panel from boars. Any of these sows exhibiting heat will be promptly slaughtered. No gilt from litters possessing any abnormality is to be saved as a breeder. This necessitates individual ear notching or face brand, with litter sheets supplying necessary data. Replacements may come from good litters farrowed at any time of year.

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In breeding, place gilts and sows with the five boars at a uniform rate throughout the year. Three farrowings per week would require approximately four exposures per week. Thus, four females would be placed with the boars each week. Boars are to be rotated among five pens of sows at 1/2 day intervals. This will prevent fighting among boars and insure opportunity for each sow to be mated with at least two boars. Hold replacement gilts until they weigh 250-270 pounds. Sows which have weaned top litters shall be returned immediately to one of the exposure pens, otherwise they go to the culled sow pen for feeding to slaughter condition. Approximately 2/3 of the reproducing females will be gilts.

It is recommended that objective selection procedures be used in choosing replacement young breeding animals based on growth rate, litter size, teat number, meatiness and backfat thickness.

## K. Poultry

### 1. Evaluation of present poultry operation:

At present enough laying hens are being carried on the Prison Ranch to supply the prison population with a sufficient quantity of eggs.

Buildings now in use for housing laying flocks are adequate for immediate needs.

The turkey operation is satisfactory.

### 2. Immediate recommendations:

- a. Because of disease and unsanitary conditions, discontinue the laying flock now being housed at the hog farm. This would necessitate providing for or building a new poultry house of comparable size at another location. The new poultry house could be constructed near the medium security housing area.
- b. Purchase only pullet chicks for replacement of laying hens and discontinue the practice of buying straight run (pullet and cockerels) chicks. In the past, light breed cockerels have been grown for meat purposes. It would be more economical and satisfactory to use special broiler or meat breeds for this purpose.
- c. Proper facilities and equipment for dressing poultry (both turkeys and chickens) should be provided. Scalding and picking equipment could be installed in the slaughterhouse.
- d. In brooding and rearing replacement pullets or meat birds, special effort should be made to maintain complete separation from adult fowl. Also, chick starter mash should contain a low level



coccidiosis preventive as this disease has apparently been troublesome in the past.

- e. Some facility should be provided for holding of eggs at temperatures between 50 and 60 degrees F. If eggs are to be washed, proper procedures are desirable. Water temperature held between 110-120 degrees F. greatly lessens the possibility of bacteria being drawn into the egg contents.

If proper washing facilities cannot be provided, dry cleaning with emery cloth or sandpaper backed with sponge rubber, or other flexible material is desirable.

### 3. Long range plans

- a. Rebuild and concentrate laying flock operations in area near medium security building. This would require the construction of several 30 x 100 foot laying houses. Separate houses are suggested because this would permit starting flocks at different times and result in more uniform production of eggs throughout the year. The buildings could be built of materials now being manufactured at the prison.
- b. Separate buildings and premises should be maintained for brooding and growing replacement pullets. These facilities could be used to grow broilers or meat birds when not in use for growing replacement pullets.

## L. Livestock Sanitation

The following recommendations are submitted by the Livestock Sanitary Board.

1. One modern dairy plant be constructed at Warm Springs; this plant to produce and process milk, cream and milk products, including ice cream, but not butter. Warm springs is suggested as a location as the best physical plant is located there and could be remodeled at the least cost to the State. Products from this dairy plant should be supplied to Warm Springs, the Prison, Galen, Twin Bridges and Boulder.
2. The slaughterhouse at the Prison Farm should slaughter and handle all the meat and meat products for the various institutions.
3. The State Veterinarian should be consulted on all dairy and animal problems, with special reference to disease control, inspection of meats and necessary tests of dairy products.
4. All new building, remodeling and purchase of equipment should be referred to the proper department heads to determine their compliance with existing laws and regulations. Special reference is made to all pasteurization equipment which should comply with 3-A Standards.



M. Continued Cooperation with Montana State College

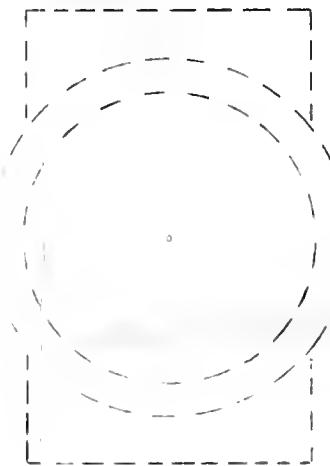
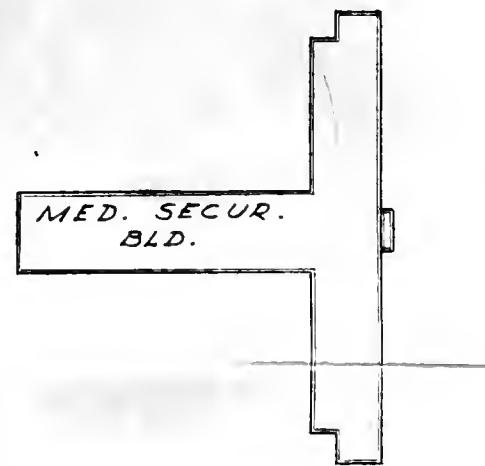
1. Building Plans

The Extension Agricultural Engineer maintains a Plan Service on farm buildings and equipment. Several of the new buildings recommended in this report are based on plans available from this Plan Service. The Extension Agricultural Engineer is always available for consultation on farm building plans whether or not they are based on stock plans.

Whenever the prison officials wish to plan a new ranch building it is desired that they get in touch with the Extension Agricultural Engineer either for plans available or for consultation.

2. All Specialists at Montana State College urge the Prison Ranch officials to call upon them for assistance at any time. Montana State College is represented in Deer Lodge by the local County Extension Agent. If any agricultural problem is made known to the local County Agent, he is at liberty to call in as many specialists as necessary to solve the problem.

NOTE : " " " "  
SHOP 32' x 100'  
LOCATE IMMEDIATELY WEST OF RANCH



POULTRY

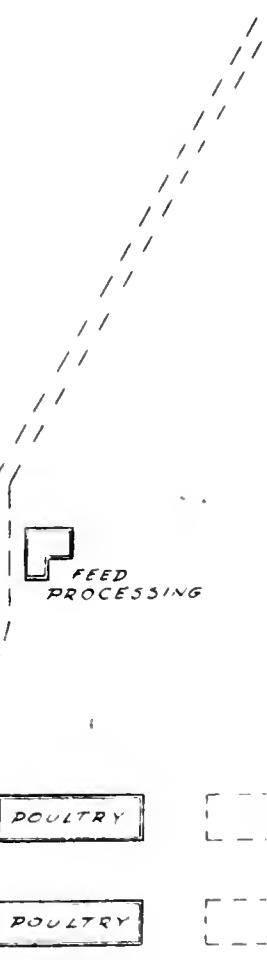
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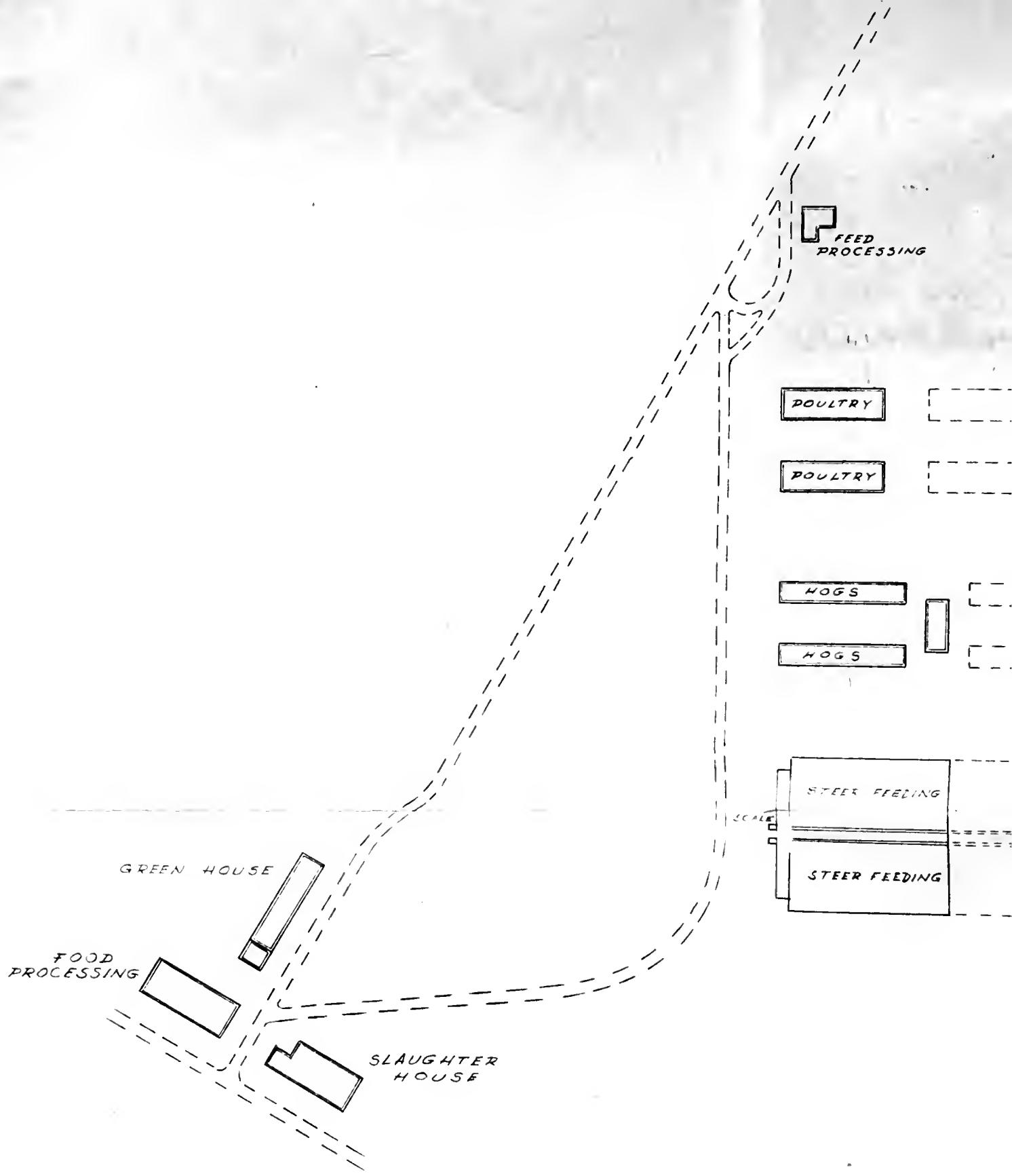
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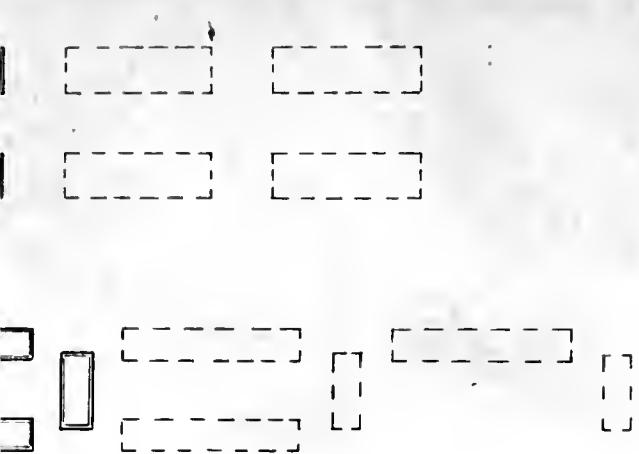
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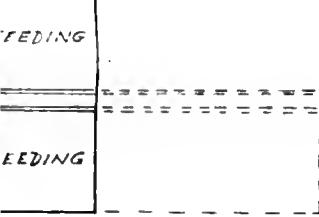


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LEGEND

- IMMEDIATE CONSTRUCTION RECOMMENDED
- FUTURE RECOMMENDATION



MONTANA PRISON RANCH

PROPOSED LIVE-STOCK BLDGS.  
LAY OUT

DRAWN BY: F. KERIO

SCALE 1" = 100'-0"

